

After the Storm:

Military Engineers and Hurricane Hugo

By Major Jeffrey R. Sommerville

It's easy to imagine the Army marching out to meet a conventional enemy on the battlefield. But what happens when the enemy is a whirling mass of destruction, immune to bullets and bombs, large enough to be seen from space, and deadly enough to level everything in its path?

When it was clear that Hurricane Hugo was going to hit the East Coast of the U.S. last year, Army engineers went into action while the storm was still 100 miles from land.

Responding to a call from the governor of South Carolina, advance parties of a National Guard corps combat battalion moved into assembly areas west of the expected storm path.

These engineers became the vanguard of a military force that would give South Carolina, hardest hit by the hurricane, a head

start on the road to recovery. During a three-week period, the group of engineers grew to more than 1500 men and women, and included members of the South Carolina National Guard and Army Reserve, active duty soldiers from other states, and Corps of Engineers personnel. Working as a team, they played a significant role in helping to put the infrastructure of the storm-stricken area back into operation.

First Call

The people of South Carolina watched closely as Hugo approached, and state officials took a number of precautionary measures to limit potential destruction by the storm. Coastal areas were evacuated, power grids were shut down, and emergency operation centers were activated.

The National Guard anticipated

its role in the recovery, so it came as no surprise when the governor's office began activating units for state duty on the afternoon of September 21, 1989. The 122nd Engineer Battalion, a corps combat battalion, and the 125th Engineer Company, a mechanized company organic to a heavy brigade, were the engineer representatives among many Guard units called to duty by the state.

The call from the governor was in reality a warning order to prepare for area damage control operations. But at the time of the call-up, little was known of what lay ahead. Commanders analyzed the mission, assumptions were made, and units task-organized themselves as best they could with what information they had. Non-commissioned officers assembled and inspected their soldiers, vehicles were inspected and dispatched, and equipment was

prepared and loaded for movement. Radio and television provided the soldiers with the latest information on the path of the storm, and by the afternoon of the 21st, it was predicted that the storm would arrive on the coast about midnight. Forecasters said the center of the storm would hit somewhere between Myrtle Beach and the historic city of Charleston.

Advance Parties

As meteorologists firmed up their estimates of Hugo's speed and course, plans were made for the movement of the engineer units. The 122nd Battalion had assembled at its armories in the western part of the state, **more** than 140 miles from the coast. The battalion was considered far enough inland to be safe, but too distant to allow quick reaction once the storm had passed. To help speed the 122nd's movement into Charleston, the battalion moved advance parties closer to the coast. Their mission was to clear routes of storm debris so that the unit's main body could move quickly into Charleston early Friday morning.

The situation was different for the 125th Engineer Company. Their armory in Bishopville put them 100 miles from Charleston, and 90 miles from the coast at Myrtle Beach. This position was considered far enough inland to be safe and near enough to the coast to afford quick reaction, so they remained at their home station during the storm. The unit was directed to move to Georgetown, midway between Charleston and Myrtle Beach, at first light Friday morning.

The meteorologist's predictions for the time and place of the storm's landfall were accurate. What they did not foresee was a hurricane that would gain in intensity as it approached the coast. This additional strength gave the

storm a boost that would carry it much farther inland than was expected. The result was severe damage in many inland areas up to and beyond the North Carolina boundary.

The engineers who moved into the area on the morning of September 22 were among the first witnesses to the destruction of the storm. As the soldiers neared the coast, their rate of march fell drastically as they encountered more and more fallen trees and other debris on the roadways. What would have been a 2-hour trip under normal circumstances became a 6-hour ordeal of clearing trees and removing rubble. Their paths into Charleston and Georgetown provided the first access into the cities for all other emergency and relief vehicles.

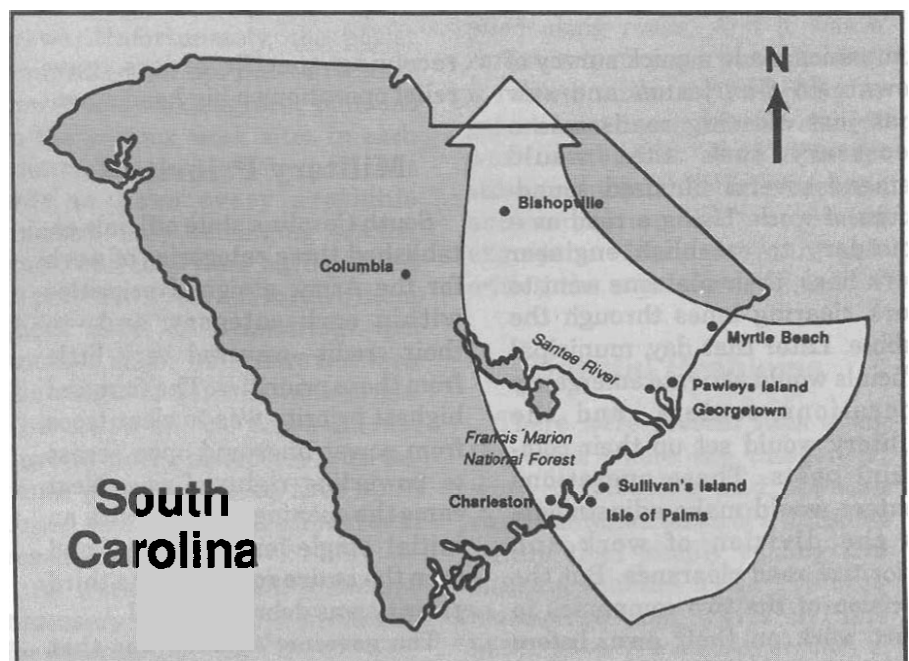
Coastal Chaos

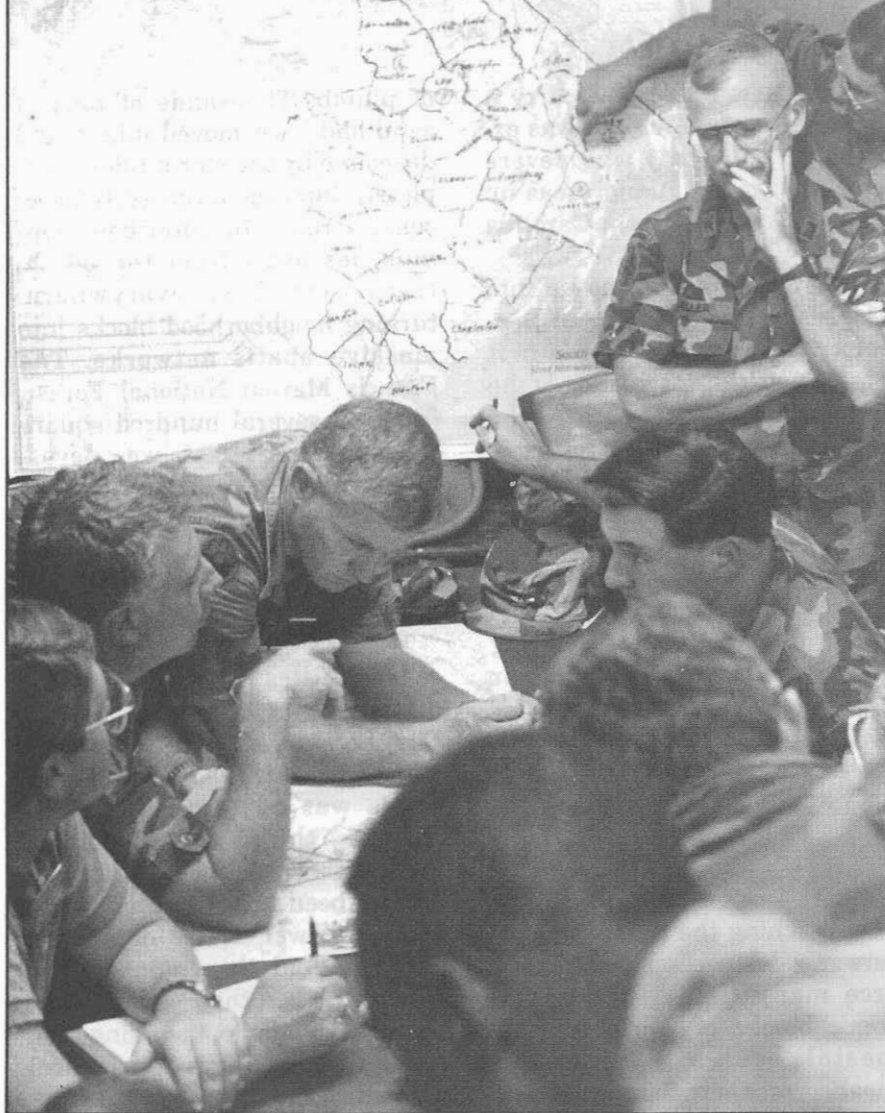
On reaching the coast, the soldiers saw destruction caused by a force many times that of the atomic bombs of World War II. Coastal houses were either smashed on their foundations or lifted up and floated away. Power lines were down everywhere, and utility poles listed dangerously out

of plumb. Thousands of tons of sand had been moved inland and deposited by the storm tides, completely burying large sections of coastal road. In suburban communities away from the beach, trees were down everywhere, turning neighborhood blocks into massive abatis networks. The Francis Marion National Forest, formerly several hundred square miles of pine forest, was devastated by the storm. From the air, it appeared that some giant scythe had sliced through the forest, leaving the trees neatly on the ground like so many rows of corn.

The first engineers arriving in coastal cities entered areas of mass destruction and confusion. They had arrived before local command and control was established. There was no communications network, the extent of damage was unknown, and work priorities had not been outlined. Cities were without power, water or sewage disposal. And the engineers did not know when their own support would be available, including fuel, rations, maintenance and medical assistance.

But in the midst of this chaos, they quickly made some simple and sound decisions. Two engineer





Commanders from the Reserve and Active Components conducted a joint planning session on the evening of September 26. The meeting resulted in a decision to divide the state into two areas of responsibility for military engineers (U.S. Army photo).

companies made a quick survey of downtown Charleston and saw that just clearing roads was a necessary task that would demand several hundred squad-hours of work. Using a road as a boundary to establish engineer work lines, their platoons went to work clearing lanes through the rubble. Later that day, municipal officials would activate emergency operations centers, and the military would set up their command posts. These operations centers would make adjustments to the division of work and prioritize road clearance. But the decision of the two companies to start work on their own, before

receiving specific orders, gave relief operations a big head start.

Military Priorities

South Carolina state officials established three categories of work for the Army, assigned priorities within each category, and—to their credit—wavered very little from those priorities. The first and highest priority was to clear trees from power lines and open access to powerline rights-of-way. Next came the opening of roads, with an initial single-lane clearing, and then the entire roadway. The third priority was debris removal.

The governor's policy was that

military units would work only on powerlines and roads, and that debris removal would be done by contract labor. Ironically, there were many times when it was necessary for the military to haul storm debris in order to accomplish their main missions. There were places, particularly in downtown Charleston, where the downed trees were so thick that crews had to haul away debris just to have room to work.

The 122nd Battalion coped with the problem by organizing day and night work shifts. The day crews would cut and stack and the night crews would load, haul and dump. This allowed them to use their equipment around the clock, while restricting the most dangerous work (chainsaw operations) to daylight hours.

The state assigned work to the military through its county emergency operations centers (EOCs). To draw a parallel with the Army's command/support terminology, the engineer units were attached to the state and put in direct support of a county. The state retained command of the units through the office of the Adjutant General. The state was responsible for their logistics support and allocated engineer companies to counties. Counties received support based on the availability of units, a declaration of the county as a disaster area, and a request for help from the county. Once allocated to a county, an engineer unit received its tasks and priorities from the county EOC.

The system ran smoothly as long as counties assigned work from the state-mandated categories I and II. Understandably, there was a temptation to assign engineers debris removal (category III) work, and the counties made many such requests. In most cases, these had to be disapproved by the engineers. The lack of a clear understanding by local officials of the state-intended role of

the Army engineers occasionally caused friction between the military and local civilian authorities.

Reinforcements Arrive

Hugo had sustained high winds all the way across the state, causing destruction over a wide area. Consequently, it took a long time for assessment teams to determine the extent of storm damage. On Monday, September 25, the governor decided to ask for help from the active Army. His request was made that evening, and within a matter of hours warning orders were being received by active duty engineer units in Georgia.

The 3rd Engineer Combat Battalion and the 92nd Engineer Combat Battalion (Heavy) from Fort Stewart, and the 43rd Engineer Combat Battalion (Heavy) from Fort Benning, underwent emergency deployment procedures the following morning. In addition to the line units, Fort Stewart sent its Victory Brigade, made up of combat support and combat service support units, into the state to support the engineers.

The response of the active units was so rapid that they were able to start their movement east toward Charleston before the state planners knew where they wanted to put them. As a result, some units began moving before their destinations were known.

Tuesday evening a joint planning session between Active and Reserve Component commanders was convened in Charleston. And once again, an engineer work line was used to give units their initial area objectives. In this case, the Santee River was used to divide the eastern half of the state into two sections, Area of Operations (A/O) North, and A/O South. A/O South would remain the work area for the 122nd Engineer Battalion, while A/O North became the responsibility of the active units and the 125th Engineer Company.

County boundaries continued to be used to subdivide the state into company-sized areas of operation.

Inland Recon

There was a major difference between the engineer work effort on the coast and that further inland. In contrast to the widespread destruction along the coast, damage to the inland counties was sporadic. As a result, units assigned to the interior of the state had to devote a great deal of their energy to reconnaissance. Again, to relate the situation in military terms, the inland work was not a great expanse of abatis, with single worksites that could swallow up a platoon-week. Instead, it was an indiscriminate series of point obstacles, spread over hundreds of square miles. A squad could work for an hour or two in one place and finish the job, and then need a frag order to tell the location of the next work site.

Because of the reconnaissance requirement, engineers working the inland counties had a problem keeping their platoons busy. Other factors complicated their ability to work on storm damage. Powerlines could not be cleared until the area was declared safe for work crews. Unfortunately, the power companies did not have the manpower to escort engineer platoons to the various work sites in each county. The goal of power officials was to have every available lineman busy rehanging electric lines, and they were hard pressed to pull employees out to have them check lines. This constraint was another major difference between the coastal and inland work areas. The crews on the coast did not have to worry about hot lines because power had been shut off in their areas before the storm reached the coast.

As work progressed, it became necessary to develop a procedure for determining when the military

effort in a particular county had been completed. This was especially important in A/O North, where platoons often sat idle because of delays in the reconnaissance process. Company commanders wanted to either get their platoons working or move them on to another county, but they had no authority to leave.

The Guard had activated two brigade-level headquarters, one in A/O North and the other in A/O South. These headquarters were responsible for allocating and monitoring engineer units among the counties in their area. They did not want to move a unit out of a county without assurance that all road clearing and powerline work had been completed. But, they had no way of knowing if the work had been completed without being notified by the county director.

Predictably, the directors acted very much like an infantry task force S-3 would react if asked if he would mind giving up a direct support engineer platoon. Directors were usually reluctant to give up an asset, even if powerline work appeared to have been completed. It was especially difficult for them to approve the release of military engineer support while significant amounts of storm debris remained piled along roads. And it was a rare county director who approved a release without attempting to get at least some debris removal work done. But state officials stuck to the established priorities, and every time a county requested exemption from the state priorities, the request was denied.

Special Problems

There were several sites along the coast where the category II work of clearing and opening routes entailed tasks of a different nature than simply cutting and clearing windfall trees. The combination of wind, waves and tide had caused tremendous erosion in



Soldiers from E Company, 3rd Engineer Combat Battalion, an Active Component unit from Fort Stewart, use a ribbon bridge ferry to take South Carolina National Guard troops to Sullivan's Island. Hugo had put the Ben Sawyer Bridge, in the background, out of commission (Photo by Jonas Jordan).

some coastal areas. In one instance, a steel highway bridge had been removed from its abutments.

The south end of Pawleys Island is not much more than a large, narrow sandbar high enough to stay dry during most high tides. But it was also home to several families. Besides destroying many of the homes on the island, the storm had played a particularly troublesome trick on the islanders. It had cut the island in half. As waters from the initial storm surge receded back across the island, a section of the island's asphalt road was washed out. The water then tore away a chunk of the island itself, undermining and overturning a house. After the surge retreated, there was a breach in the island about 10 feet deep and 30 feet wide. Depending on the tide, water flowed through this breach at a rate of several hundred to several thousand cubic feet per second.

Initially, it was thought that a bridge, culvert or cofferdam would be needed to close the breach, but the decision was made to try and plug the gap with sand. The 122nd Battalion was given the task. Two early attempts ended in failure as

the heavy tide flow quickly erased any evidence that men and machines had been at work. The engineers marshalled their resolve and resources. Brick and stone rubble were piled next to the breach. This would be used later to form an erosion-resistant base at the bottom of the gap. A full day was also spent stockpiling sand on the shoulders of the breach. When low tide arrived, they were ready for their third assault on the island breach.

Dozers working both sides of the breach first pushed in the rubble. Then the stockpiled sand was dozed into the breach as fast as the engineers could move it. The engineers worked their bulldozers continuously for 6 hours. Their dump trucks were kept running the length of the island, feeding more and more sand to the dozers. When the next high tide arrived, the engineers' hard-fought repair work held back the water and the island was joined together again.

The Island Ferry

The Isle of Palms and Sullivan's Island, two other coastal residen-

tial areas, were also isolated by the work of Hugo. Both islands had been connected to the Charleston suburb of Mt. Pleasant by the Ben Sawyer Bridge. The bridge was designed to allow ships through the navigation channel by rotating on a pedestal in the middle of the channel. Hugo had dislodged the abutments, rotated the bridge, then tipped the superstructure so that it slipped from its bearing on the center pedestal. One end of the bridge ended up in the channel, and the other end pointed skyward. The two islands serviced by the bridge faced long-term isolation and a bleak future.

The islanders' plight was answered by E Company, a bridge unit from the 3rd Engineer Combat Battalion at Fort Stewart. The company had arrived in Charleston the day after the governor's call for Active Component assistance, and was task organized under the 122nd Battalion.

After surveying the area, Echo Company leaders found that a launch ramp near the base of the Ben Sawyer Bridge provided an excellent access point. However the lack of a suitable abutment on the island side of the channel precluded construction of a bridge. An egress point was located further north on the island, and Echo Company soon had a ribbon bridge ferry in operation. The determination of who could use the ferry was handled by municipal authorities. This left the soldiers free to operate the raft and contend with the problems of crossing non-tactical vehicles on ribbon bridge equipment.

The Corps

While soldiers of the Active and Reserve Components were working in the media spotlight, the third leg of the engineer triad was busy at work behind the scenes. The Charleston District of the Army Corps of Engineers played

several key roles in the disaster relief operation, although very few of South Carolina's citizens were aware of their relief efforts. Much of their work was done from inside buildings and over the telephone, but they also performed duties on the highways and waterways.

One of the Corps' first tasks was to activate and dispatch damage survey teams to inspect areas hit by the storm. These teams formed part of the federal government's reconnaissance effort that would lead to the declaration of federal disaster areas within the state. These teams included electrical engineers, who assessed the power supply damage, and structural engineers, who looked for damage to bridges. They also surveyed the problem of debris removal, providing a state-wide picture of the significant trash disposal problem.

Contract negotiation was a critical and time-sensitive part of the Corps' relief contribution. While work was still being done to clear roads and restore power, a warning went out that an exceptionally high tide was due to arrive. The tide was expected to cause extensive damage in many coastal areas, unless artificial barriers could be constructed. With no time to waste, the Charleston District contracted with civilian companies for the construction of artificial dunes in the most vulnerable areas. Within a matter of days, the contract equipment was on site and piling sand. When the high tide arrived, the dunes were already in place, and the coast was protected.

Perhaps the most visible work by the Charleston District was the restoration of the Ben Sawyer Bridge. District crews used barges, tugs and a crane to lift the bridge back onto its pedestal and realign it with its abutments. Two barges were positioned to serve as floating abutments, and steel bents were constructed on the barges. A third barge was used to sup-

port a crane. The crane lifted the low end of the bridge, allowing the superstructure to be placed onto the two floating abutments. The tugs were then used to maneuver the floating abutments until the bridge was realigned with the approaches. Although unable to rotate on its center pedestal, the bridge was back in operation within two weeks of the storm.

Stand Down

Deactivation of Guard units and release of the Active Component soldiers began during the second week of recovery. The first unit released was the 125th Engineer Company, the Guard unit from Bishopville. The unit was faced with a situation unique among all of the Army units assisting the relief efforts, and it was felt they deserved an early release.

The 125th had been activated on September 21, just before the storm, and spent the night at their armory. At the time those orders were issued, it was believed that their home station of Bishopville and surrounding Lee County would not be significantly affected by the storm. But when they departed Bishopville the next morning, they left behind heavily damaged homes and property, and families that were stranded without power.


Several days later, Lee County was added to the list of counties that were federal disaster areas, and on September 27, a company from the 43rd Engineer Battalion was assigned to Lee County to perform category I and II missions.

The men of the 125th had left their homes without knowing whether their families were safe and their property secure. They went to work in neighboring communities to help fellow citizens, who in some respects were better off than their own families. But these soldiers followed their orders and made a personal sacrifice

not often seen in a peacetime Army.

By the end of the first week of October, all road and powerline work in the state had been completed, and units were either on their way home or planning to leave soon. All components of the Army had responded quickly to the emergency, and had worked together well to restore order to the stricken communities.

Looking back at those few weeks of work in the wake of Hugo, a young training NCO from the South Carolina National Guard said, "This was the most real thing we have ever done...we cut our way into this city and found out there was...no power, no water, no toilets, nothing. And nobody knew what was going on. The chaos and confusion that existed in this place during those first couple of days has got to be the closest we'll ever get to battlefield conditions....But we got organized, we got busy, we got to work...and we got things done."

The men and women engineers who answered the call for help in the wake of Hurricane Hugo had worked selflessly to aid their own countrymen. And not only did they make a difference in the lives of thousands of fellow Americans, they gained experience that made them better soldiers. 

Major Sommerville is the Engineer Team Chief, Readiness Group, Fort Jackson, South Carolina. He previously served as a project manager for the Louisville District of the Corps of Engineers. His other assignments include company commander, assistant S-3, and assistant division engineer in the 9th Infantry Division. Major Sommerville is a West Point graduate, and holds a masters degree in civil engineering from Washington State University.